Research Article

The Interacting Role of University Ranking and Globalization of Education

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Abstract

Background: Based on the plan of revolution and innovation in medical education that was issued by the Iranian Ministry of Health and Medical Education, and the extensive role of such programs in the qualitative promotion of universities, The academic ranking of world universities is of great importance, since the qualitative and quantitative implementation of academic ranking can influence the realization of the university's goals. Hence, the current study aimed at collecting data about the academic ranking of world universities as well as its criteria and indices and their relationship with globalization.

Methods: To gain access to reputable databases in university ranking, an extensive search was performed in Google Scholar. Thereafter, after getting access to reputable databases such as Shanghai Jiao Tong University (SJTU), Times higher education world University ranking (THE), Quacquarelli Symonds world University rankings (QS), Webometric, and Islamic world science citation center (ISC), data were collected and classified.

Results: Based on the collected data, the history of university rankings and ranking systems, as well as criteria and indices pertaining to the academic ranking of world universities, was derived, and the specificities of the criteria and indices were discussed.

Conclusions: University rankings are usually performed on a combination of performance-associated indices and criteria. Efforts to achieve a desirable position based on the criteria and indices of the ranking system play an important role in the promotion of educational quality and globalization.

Keywords: International Ranking System, Universities, Index, Globalization

1. Background

Participating in scientific competitions, at domestic and international levels, gaining current, up-to-date knowledge, upgrading human resources, and paying extensive attention to the qualitative advancement of Iran universities are of great concern (1). One goal of the plan of revolution and innovation in medical education that was issued by the Iran ministry of health and Medical education is globalization of medical sciences education (2). International communication and globalization of education are among the quality advancement methods (1, 3). One of the main ways to improving the quality of universities and medical education is to participate in international scientific competitions with top universities, which can be recognized using the world university ranking systems (4-6). By using the world university ranking system and understanding the specific criteria and indices of top universities, an educational strategy can be developed to promote the quality of education in the target university. Hence, the current study was conducted in order to answer the following questions:

What are the available world university ranking systems? What are their criteria and indices? Is there any relationship between the academic ranking of universities and the globalization of education?

2. Methods

To get access to reputable world university ranking databases, an extensive search was performed in Google Scholar. Out of the extracted databases, the most frequent ones were selected, including Shanghai Jiao Tong University (SJTU), times higher education world University rankings (THE), Quacquarelli Symonds world University rankings (QS), Webometric, and Islamic world Science citation center (ISC). Then, the required data were extracted from these databases and categorized accordingly.

3. Results

3.1. History of World University Rankings

World university rankings were first conducted in 1998 in SJTU by the order of the Chinese president in order to

evaluate the performance of some Chinese universities at the global level and set a goal for them to achieve top placements. To achieve that purpose, Chinese authorities attempted to develop a model for world university ranking, and then evaluated Chinese universities in comparison with other universities around the world; then, they identified the strengths and weaknesses of Chinese universities, and, finally, took the necessary measures to improve the placement of their universities in the world. The SJTU was thus given a mission as a research project to rank all the world universities and accordingly evaluate the placement of Chinese universities. The world university ranking aimed at determining the gap between Chinese and top world universities in order to reduce the gap and improve the quality of education and placement of Chinese universities in the world university ranking. The results of that investigation, known as the academic ranking of world universities, were reported in 2003 for the first time, and are upgraded annually. Different ranking systems rely on available factors such as experimental statistics, evaluation of teachers and lecturers, scholarships, students, and university volunteers, or may be developed based on the university entry exam and admission processes (4, 6).

3.2. The World University Rankings

More than 25 university ranking methods were provided, out of which mostly the SJTU, THE, QS, Webometric, and ISC were used (4, 7, 8). Examples of different rankings are provided in Tables 1 to 8.

3.2.1. SJTU Ranking

The academic ranking of world universities is performed based on different factors (Appendix 1). According to the SJTU ranking, world universities are ranked independently. The ranking criteria rely on the following parameters:

Number of articles published in Nature and Science journals (active in natural sciences arena); number of faculty members and graduated students who won Noble prize, Fields Medal, or other important scientific awards; number of articles indexed in ISI; the educational performance of the university based on the number of students and faculty members.

The SJTU ranking is performed by the Shanghai ranking consultancy institute and is published in The Economist. One of the criticisms of the SJTU ranking is that it relies on natural sciences and English language journals; in addition, it focuses on scientific awards won by the professors and graduated students, but the quality of education or human sciences aspects are not considered in this method (6, 9-11).

3.2.2. THE Ranking

The times higher education world University ranking, from the UK, was used to report the top world universities annually as THE-QS World from 2004 to 2009. One of the criticisms of this ranking method is that, unlike the SJTU model, which mostly concentrates on academic issues, the THE model relies on the reputation of universities. Hence, since 2009, the THE model has been separated from QS, which provided a new ranking system in cooperation with the Thomson Reuters database. In this new model, 13 indices were considered (Appendix 2), categorized into 5 groups as education, research, knowledge transfer (number of citations), industrial income, and international reputation (6, 12-17).

3.2.3. QS Institute Ranking

This institute from the UK published an independent inventory after separation from the Times Institute. Its ranking report is published by US News and World Report as the best world universities. The QS annually attempts to rank universities in cooperation with Scopus, one of the most reputable world databases. Its annual report has been published since 2011 in 5 groups and 42 subjects: in natural sciences, engineering and technology, natural sciences and medicine, social sciences, and art and human sciences. The QS ranking relies on 6 criteria: university reputation (40% weight), reputation of the staff and employees (10% weight), the ratio of faculty members to students (20%), the number of citations for each faculty member based on the Scopus database (20% weight), the number of international faculty members (5% weight), and the number of international students (5% weight); these are the main quality assessment criteria (Appendix 3), and the top world universities in each field are reported accordingly.

According to ISC, the QS assessed 2691 institutes of higher education from 125 countries in 2016, out of which 945 institutes from 62 countries were placed within the acceptable limits, and finally the top 400 world universities in all fields were introduced. Of those top world universities, 200 belonged to only 55 countries, out of which 38 countries have at least one university among the top 50 world universities. The institute now evaluates 33,744 scholars and researchers from different universities worldwide for ranking. In addition, the institute, in cooperation with Chosun Ilbo newspaper from South Korea, annually reports the top 200 Asian universities, which sometimes is slightly different from the top world universities (6, 10-12, 16).

Table 1. An Example for Academic Ranking of the World Universities in 2016 (General Ranking)

University	Country	Global Ranking	National Ranking	Total Score	Alumni Score[a]	Award Score[b]	HiCi Score[c]	N and S Score	PUB[d] Score	PCP Score
Harvard	USA	1	1	100	100	100	100	100	100	79.2
Chicago	USA	10	8	54.2	59.8	86.3	34.0	42.7	50.2	44.5
King Abdul-Aziz University	KSA	101 - 150	1 - 2	-	0	0	52.3	9.1	47.8	18.1
King Saud University	KSA	101 - 150	1 - 2	-	0	0	42.3	6.2	46.1	17.4
University of Tehran	Iran	301 - 400	1	-	12.6	0	0	1.5	41.2	20.8
University of Amir Kabir	Iran	401 - 500	2	-	0	0	14.5	0	31.5	17.1
University of Istanbul	Iran	401 - 500	1	-	18.5	0	0	3.5	34.6	18.4

Abbreviations: N and S, Nature and Science; PCP, Per Capita Academic Performance.
[a] Alumni, Number of graduated students who won Nobel Prize and Fields Medals.
[b] Award, Number of Nobel Prizes or Fields Medals ranted to faculty members.
[c] HiCi, Number of highly cited researchers.
[d] PUB, Number of articles indexed in ISI and SSCI.

Table 2. An Example for Academic Ranking of the World Universities in 2016 (Subject Ranking)[a]

University	Country	Global Rating	Total Score	Alumni Score[b]	Award Score[c]	HiCi Score[d]	PUB Score[e]	TOP Score[f]
Harvard	USA	1	100	100	49.8	100	100	95.9
Chicago	USA	43	47.5	52.2	0	21.8	39.0	92.0.

[a] None of the Iranian, nor any neighboring countries, placed in medicine and pharmacy. The scientific and subject ranking span ranges from 1 to 200.
[b] Alumni, Number of graduated students who won Nobel prize and fields medals.
[c] Award, Number of Nobel prizes or fields medals granted to faculty members.
[d] HiCi, Number of highly cited researchers.
[e] PUB, Number of articles indexed in ISI and SSCI.
[f] TOP, Percentage of the articles published in more than 20% of all journals in medical sciences.

Table 3. An Example of Academic Ranking of the World Universities in 2016 Based on the Quacquarelli Symonds Model (General Ranking)

University	Country	Global Ranking	Total Score	Academic Credit	Student to Lecturer Ratio	Research	Employer's Credit	International Students	International Lecturers
King Fahad University of Petroleum and Minerals	KSA	189	48.3	29.3	89.0	31.4	40.3	64.4	100
Kind Saud University	KSA	227	43.4	34.5	88.5	-	33.4	-	98.8
King Abdul-Aziz University		283	37.6	27.3	66.5	-	-	68.1	99.0
Bilkent University	Turkey	411 - 420	-	28.8	-	30.1	38.4	-	58.8
Sabanci University	Turkey	441 - 450	-	-	45.2	-	-	-	48.0
Sharif University of Technology	Iran	431 - 440	-	-	-	92.2	-	-	-
Iran Science and Technology University	Iran	491 - 500	-	-	-	97.7	-	-	-

3.2.4. Webometric Ranking

This ranking system, developed by the cybermetric laboratory of the center for scientific information and documentation (CINDOC) in Spain, is an index for ranking the websites of universities, institutes of higher education, and research centers worldwide. Webometric analyzes the world universities based on their website contents. Webometric is a database that includes thousands of universities and research centers that are ranked based on their content and data provided in cyberspace. Webometric's first ranking was provided in 2004 based on indices such as the size of data on the website, the accessibility of data on the website (visibility), the ratio of data published on the web to the number of external links (rich files), and the number of published articles and citations (scholar) (Appendix 4). Webometric aims to draw the attention of such institutes to their online publications. Because of this, universities with high educational quality may not hold an expected place in this ranking due to their lower interest in online publication policies; however, there is a correlation between this ranking system and other similar systems. North American universities mostly rank among the

Table 4. An Example of Academic Ranking of the World Medical Schools in 2016 Based on the Quacquarelli Symonds Model (Subject Ranking)[a,b]

University	Country	Global Ranking	Academic Credit	Employer's Credit	Citation	H-Index
King Saud University	KSA	251 - 300	43.4	67.8	79.9	60.7
King Abdu-Aziz University	KSA	301 - 400	51.5	54.0	68.1	44.6
Istanbul University	Turkey	251 - 300	49.7	2.8	74.8	59.0
Ankara University	Turkey	301 - 400	44.7	41.2	72.2	45.5
Tehran University of Medical Sciences	Iran	251 - 300	54.8	68.0	67.9	55.1

[a]QS ranks universities in 42 different subjects based on academic credit, employer credit, and research.
[b]Six medical sciences universities in Asia, ranked 22 to 49, are among the top 100 world universities.

Table 5. An Example of Academic Ranking of the World Universities in 2016 Based on the Times Higher Education Model (General Ranking)

University	Country	Global Ranking	Education	Research	Citations	Industrial Income	International Reputation
Iran Science and Technology University (Elm and Sanaat University)	Iran	401 - 500	25.9	26.0	42.3	61.2	12.2
Sharif University of Technology	Iran	401 - 500	26.6	30.1	33.7	87.8	15.9
King Abdu-Aziz University	KSA	251 - 300	23.9	11.8	76.6	73.1	93.0
King Saud University	KSA	501 - 600	25.4	16.1	24.4	81.2	84.5
KOC University	Turkey	251 - 300	21.2	27.1	74.9	82.4	53.5
Bilkent University	Turkey	351 - 400	23.5	18.6	64.1	36.4	47.5

Table 6. An Example of Academic Ranking of the World Medicine Schools in 2016 Based on the Quacquarelli Symonds Model (General Ranking)

University	Country	Global Ranking	Education	Research	Citation	Industrial Income	International Reputation
Tehran University of Medical Sciences	Iran	501 - 600	51.8	20.0	9.3	30.0	14.1
King Saud University	KSA	501 - 600	20.0	17.5	22.3	57.4	75.5
KOC University	Turkey	251 - 300	21.2	27.1	74.9	82.4	53.5
Istanbul University	Turkey	601 - 800	26.0	23.3	10.0	100	20.0

Table 7. Webometric Ranking of the World Universities in 2016 (General Ranking)

University	Country	Rank
University of Tehran	Iran	411
Tehran University of Medical Sciences	Iran	421
University of Istanbul	Turkey	491
Middle East Technical University	Turkey	548
King Saud University	KSA	328
King Abdul-Aziz University	KSA	563

top 200 world universities, but medium and small medical institutes as well as Japanese, Italian, French, and German universities rarely place among the top universities, which

can be attributed to the higher share of their non-English language online data (3-12, 14, 15, 18, 19).

3.2.5. ISC Ranking

In the Islamic summit conference in 2005 held in Makkah, KSA, it was revealed that a low number of Islamic world universities were included in the top 500 world universities; the idea of an academic ranking of universities in the IOC (cooperation of Islamic organization) countries emerged, and a model was developed to identify the top 20 Islam world universities to be supported and included among the world's leading universities. In the 2006 summit in Kuwait, a committee was introduced in order to study the world university ranking systems and compile a ranking system for the OIC countries. In the 2007 summit

Table 8. An Example of Academic Ranking of the World Universities in 2016 Based on the Model of Islamic World Science Citation Center (General Ranking)[a]

University	Country	Rank	Scientific Effect	Scientific Diplomacy	Scientific Production	Economic Effect	Total Score
University of Tehran	Iran	1	42.50	8.93	31.52	1.23	84.19
King Saud University	KSA	2	37.52	5.42	18.77	2.17	63.89
Middle East Technical University	Turkey	5	22.67	8.08	20.89	4.11	55.75
Tehran University of Medical Sciences	Iran	6	30.17	7.13	16.51	1.44	55.25
Sharif University of Technology	Iran	7	24.49	5.11	22.29	1.92	53.81

[a]The latest data published on ISC, 2013 - 2014.

in Tehran, Iran, a draft of the university ranking system was provided, and the complete version was confirmed in May 2007 in Tehran (4, 8, 19). The criteria and indices of the developed system are provided in Appendix 5.

3.3. The Criteria and Indices for the Academic Ranking of World Universities

Each academic ranking system was developed based on particular criteria and indices. The criteria and indices, as well as their weights used in the aforementioned ranking systems, are provided in Appendix 1 - 5 (4, 6, 7, 15, 19-21), which mainly evaluate the most reputable and oldest model, the SJTU ranking system. The method of measuring indices is shown in Table 1.

To extract the rank and score of universities, the general plans and strategies (general ranking) as well as programs and curriculums of different disciplines (subject ranking) offered in a university such as medicine, mathematics, chemistry, and physics are used. The academic ranking of Iranian, Turkish, and KSA universities is shown in Table 1 (21-27).

4. Discussion and Conclusion

Several ranking systems are available to rank universities at national, regional, and global levels using similar and different criteria and indices (3). Five academic ranking systems were discussed in the current study including SJTU, THE, QS, Webometric, and ISC. Results of the current study indicate that international scientific cooperation as well as developing communication with other countries result in the promotion of scientific quality of universities (1). According to the experts, globalization and quality promotion in universities are closely related to competition in world rankings; in other words, getting a higher placement in the world rankings requires international communication and quality promotion. On the other hand, globalization and quality promotion can be met by joining the ranking systems and competing to get a higher placement in the world. For instance, some countries simply send their students to countries with high-ranking universities (28).

According to the results of similar studies, academic ranking of world universities strictly depends on the amount of research from the university; globalization of postgraduate educational and research affairs, particularly in PhD courses, provides more supports for research activities. In fact, factors such as the number of students and faculty members play a particular role in globalization. The number of PhD students is important for further research and recruitment of faculty to study and teach at the Master's degree level; hence, for countries that intend to increase the number of nationally and globally reputable universities, we recommend that they expand research capacity and promote educational and research quality in their universities, especially as compared with other reputable universities (29, 30). It can be concluded that getting a desired position based on the criteria and indices of global ranking system plays a significant role in quality promotion and globalization. Further studies on the analysis of criteria and indices influencing the academic ranking of world universities as well as finding new solutions to upgrade universities are recommended.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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